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Abstract

The sharing of knowledge between geographically distributed communities is an activity that is routinely undertaken in almost all large organizations but one that poses several problems for the researcher. This paper examines some of the key issues that need to be taken into account when undertaking research in this area. Its focus is knowledge sharing in the type of geographically distributed communities found in large multi-site and multi-national organizations. It highlights some of the conceptual problems associated with this type of knowledge sharing and presents a case study of an on-line knowledge sharing community in a large multi-national organization. It reflects on the issues raised by the literature and the case study and concludes by arguing that the search for generic solutions for these issues risks underplaying the importance of the diversity and plurality of viewpoints that are found in such groups.

Keywords: Computer Mediated Communication, Geographically Distributed Communities, Knowledge Management, Knowledge Sharing, Research Issues.

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Abstract

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1. An Introduction and Definition of Terms

Knowledge sharing is an activity that is undertaken routinely in almost every area of life. Although few would deny that knowledge can be transferred from one person to another, as we shall see, beyond the broad acceptance that knowledge sharing 'happens' there is much room for debate. In this paper, we wish to focus on the sort of knowledge sharing that takes place in large multi-site / multi-national organizations. In order to narrow the field of discourse we begin by defining some key terms.

We are primarily interested in the sort of knowledge exchange that takes place within formally constituted organizations. That is, we wish to focus on the purposeful, goal directed sharing of knowledge within a managed and regulated organizational framework, rather than on interest driven learning such as that which might be found in more informal and unstructured groups.

We are also interested in knowledge sharing within geographically distributed groups. While we do not want to exclude the possibility of face-to-face meetings, in practice, this means that much of the communication between the members will be technologically mediated and almost certainly involve the use of computer technology.

Broadly speaking, this places the focus of our work at the intersection between Knowledge Management and Computer Mediated Communication. These terms will be explored in detail in the sections that follow; however to help further define the scope of our work we will provide a brief definition of these terms here.

By Knowledge Management (KM), we mean the broad body of theory that deals with how organizations make use of the knowledge held within them to achieve a set of strategic goals. From this viewpoint, knowledge is seen primarily as a resource and a source of competitive advantage.

We use Computer Mediated Communication (CMC) as a generic term used to describe any form of person-to-person communication via the medium of computer technology. This might be interaction through 'traditional' storage/retrieval information systems, more interactive 'Web 2.0' technologies or even the humble telephone.

Having set the scope for our paper by providing some initial definitions, the rest of this paper is structured as follows. We begin by looking at the origins of knowledge sharing and knowledge management and examine why they are seen as so important in large organizations. This is followed by an examination of the conceptual problems associated with knowledge sharing and a brief review of some previous work on the topic. We then present a case study of an internationally distributed community, the HMI community, which is managed from the HQ of Schneider Electric, a large multi-national engineering company based in France. The paper concludes by reviewing the issues raised in the literature and the case study and arguing for the importance that the diversity and plurality of viewpoints found in such groups has for research in this area.

2. Knowledge Management and the Problems of Knowledge Sharing

In this section, we look more closely at the roots of KM and explore some of the problems that are associated with the concept of knowledge sharing. We highlight the close association between the concept of KM, its supposed function as a motor for economic growth and the role played by technology. We also look more closely at the

problems of sharing knowledge, particularly at the problem of establishing a shared and stable meaning during the process of communicating a piece of knowledge.

2.1. The Origins of Knowledge Management

KM is not a particularly new idea. For example, in 1975 the journal Public Administration Review invited seven authors to write "*A Symposium on Knowledge Management*" which dealt with issues such as the increasing importance of knowledge in society and the impact that technology would have on our ability to manage it (Carroll & Henry, 1975). Although Wilson (2002) traces the idea of KM back to Taylor's (1911) thesis on scientific management, the more immediate historical roots of KM lie in the work of authors such as McLuhan (1964), Ellul (1964) and (Hiltz & Turoff, 1978).

During the latter part of the last century, these authors, among others, predicted imminent and radical social and economic change, driven primarily by developments in technology. In the years of economic growth that followed the recession of the 1980s, and before the bursting of the dot-com bubble in early 2000, it began to appear to some as though these predictions had begun to come true. Harris (2001) describes how this time was seen as,

> *"... the beginnings of a great new era, a third industrial revolution, founded on new technologies rooted in computers and the potential of new information technologies" (Harris, 2001, p. 22).*

The key to sustaining this new industrial revolution was knowledge. Nonaka and others claimed that knowledge was "... *the one true source of lasting competitive advantage*" (Nonaka, 1991, p. 96). Kogut and Zander (1992) argued that successful firms could be built on combining existing knowledge with new ideas to create novel innovations. Similarly, Grant (1996) claimed that,

> *"Sustainability of competitive advantage therefore requires resources which are idiosyncratic (and therefore scarce), and not easily transferable or*

replicable. These criteria point to knowledge (tacit knowledge in particular) as the most strategically-important resource which firms possess" (Grant, 1996, p. 376)

This conviction was not restricted academics. In the UK, the then Prime Minister, Tony Blair, claimed his ambition was to turn Britain into a knowledge-based economy arguing that,

"In global markets, where products can be made anywhere and shipped anywhere, in which production technologies can soon be copied, ... Knowledge is replacing material ... advances in knowledge are the driving force behind the industries of the future". (Blair, 1998)

2.2. Knowledge Management and Technology

In the field of Information Systems, there were several attempts to develop a technological framework for managing knowledge. O'Leary (1998) and Alavi and Leidner (2001), argued from a traditional information systems perspective that the future of KM was tied to the development of Knowledge Management Systems (KMS) based on the capture and codification of knowledge. From a different viewpoint, Steinmueller (2000) argued that developments in information technology would soon allow "*social knowledge*" within communities to be captured, analyzed and stored in an organizational memory (Stein & Zwass, 1995).

Codification is central to the IT based view of KM. It is concerned with the process by which 'irrelevant' data can be stripped away so that something created in one setting, can be stored, independent of any particular viewpoint, and reconstituted later in a different setting. To be effective, codification requires some means of managing the context within which the stored representation of the original item will recreated. For this to work reliably, the form in which the knowledge is stored needs to be reasonably closed and complete, that is to say it must not rely too heavily on factors that are not contained within the representation itself and that the representation must be robust enough to cover the majority of cases.

In the field of information systems, this process is reasonably well understood and the context needed to recreate information from data is provided by the use of data dictionaries combined with organizational policies and guidelines. The challenge for KM is to achieve the same outcome with knowledge rather than information.

2.3. Knowledge Management and Knowledge Sharing

While codification appears to provide a convenient solution to the problems of managing and sharing knowledge, it is not without problems of its own. McDermott (1999) for example, claims that while IT may have inspired KM, IT alone will never be able to deliver it. Duguid (2005) argues that codified knowledge can never be an adequate base for knowledge sharing and highlights the problems of recursiveness that are inherent in such approaches.

> *"Codification cannot explain how we come to read new codes. If all we have is the explicit, then a new codebook must either explain itself or require another codebook to do the explaining." (Duguid, 2005, p. 111)*

Marshall and Brady (2001) on the other hand, while not addressing the philosophical question of the codifiability directly, argue that even if such knowledge were to exist it would be of limited use for KM as such representations can never be complete.

Starting from the viewpoint of communicating rather than storing knowledge, they argue that communication requires the establishment of inter-subjective common ground. They agree with the advocates of codification that, the more closely the contexts match, the more accurate is the message, but depart from their viewpoint by arguing that these contexts are not, and never can be, complete.

> *"Linguistic meaning is never complete and final … It is unstable and open to potentially infinite interpretation and reinterpretation in an unending play of substitution" (Marshall et al., 2001, p. 101)*

Even if great efforts are made to define the original meaning carefully, new and alternative meanings will appear that were never foreseen. While it may be possible to establish a shared basis for exchange of explicit (codified) knowledge between competent and knowledgeable actors in a particular domain (e.g. scientists who are working on the same scientific problem), codification per se, is inherently limited as an approach to KM as any meaning derived from the codified knowledge will be ambiguous and unstable.

3. Some Case Studies of Knowledge Sharing

Although KM and Knowledge Sharing are clearly complex problems, searching the literature quickly reveals that there is no shortage of studies on the topic. Table 1 below shows a small selection of articles to illustrate the themes.

Brief Description	Article
Study based on knowledge sharing in 15 different on-line communities.	(Cothrel & Williams, 1999)
Article based on an analysis of geographically distributed communities within IBM Global Services.	(Gongla & Rizzuto, 2001)
A case study of virtual knowledge sharing communities at Caterpillar.	(Ardichvili, Page, & Wentling, 2002)
A case study of knowledge sharing at Buckman Labs, a US chemical company via the "TechForum".	(Pan & Leidner, 2003)
Ten case studies of the sharing of structured knowledge in large companies (>1000 employees).	(Huysman & de Wit, 2004)
Six case studies of "knowledge communities" in Unilever, AtosOrigin, The Delft Cluster Oracle, Habiforum and Shell.	(Andriessen, 2005)
Case study of Siemens use of ShareNet in China based on 35 interviews.	(Voelpel & Han, 2005)
A case study of knowledge sharing in a global player in the construction materials industry.	(Perrin, Vidal, & McGill, 2006)
Knowledge sharing in Malaysian organizations with a particular focus on organizational culture	(Suppiah & Sandhu, 2011)

Table 1 A selection of case studies of knowledge sharing

Cothrel and Williams (1999) is one of the earliest studies that focus specifically on this area. They examined 15 corporate communities to try to find out what made them successful. Most of the studies were in large, international groups and included both internet and intranet based communities. Similarly, Gongla and Rizzuto's (2001) work

was based on IBM global services. Their object was to trace the evolution of knowledge sharing groups, which they termed Communities of Practice (CoPs), and was based on their experiences with 60 different networks in IBM. Ardichvili Page and Wentling (2002) also used the 'CoP metaphor' to look for success factors in this type of group but this time using only a single, in depth case study of a multinational corporation.

These earlier studies were clearly exploratory and their theoretical content was generally very broad. For example, although Gongla and Rizzuto (2001) and Ardichvili et al (2002) made explicit references to KM and the role the CoPs might play, the findings were more pragmatic. Later studies made a greater effort to locate knowledge sharing in a broader theoretical context. Huysman and de Wit (2004) for example, used the notion of social capital to argue for a socio-technical approach to the design of systems to support knowledge sharing while Voelpel and Han (2005) place their work in the context of the differences between Asian and Western multinational companies and looked at the effects culture and nationality could have using a study of knowledge sharing.

Others (Andriessen, 2005), have looked at structural similarities in knowledge sharing groups or at the strategies used to implement them (Perrin et al., 2006). However, all recognize, to a greater or lesser extent, firstly the importance of human relationships and tensions between creating an environment where people are able and prepared to share knowledge, and secondly the problems of doing this remotely and within a corporate setting. It was these two observations that formed the starting point for our study.

4. The HMI community Case Study

The case study is based in Schneider Electric, a global leader in energy efficiency technologies that has sales revenues of nearly 16 billion Euros and employs more than 130,000 people worldwide. In 2005, Schneider Electric took a strategic decision to invest in on-line knowledge sharing communities, which it saw as an activity that involved "*a relatively low investment but produces a continuous high return*" (Gelin & Milusheva, 2011, p. 6). Schneider now has over 500 such communities with more than

12,000 active registered members. The case study we present here is of Human Machine Interface Community of Practice, usually referred to as the HMI CoP.

4.1. The Organization of the Community

The HMI CoP was created in 2006 with the goal of improving knowledge sharing between the technical and commercial functions in the organization concerning HMIs (Human Machine Interfaces), which is one of the fastest growing product areas for Schneider. The community was one of the first to be created within Schneider Electric and was conceived of as a virtual space within which to share product, application and solution knowledge. The type of knowledge that is shared might include specific details of the requirements for local markets, the strengths and weaknesses of competitors and solutions to problems that occur in one country that have already been solved in another.

The community is managed from Schneider's development centre in France by what is known locally as an animator. The role of the animator encompasses that of a moderator in a traditional on-line web forum and the chairperson in a face-to-face meeting. The animator drafts and presents the agenda for web meetings, provides updates on the life of the Community and schedules upcoming meetings.

In addition to the animator, the community has a steering committee consisting of eight core members who are 'elected' based on the number of HMiles they accrue. HMiles are a way of formally recording the participation of the Community's members. HMiles track a member's activity in the Community through their attendance at monthly meetings, active participation during web meetings and involvement in the discussion forum (see Table 2 below).

Finally, members who are recognized by the community as being experts in a certain field are given the title 'Sponsor' of a part of the community's website in recognition of their status. The sponsor of a particular area becomes responsible for ensuring that the data held in that part of the site is accurate and becomes the first contact for anyone wishing to ask a question or add content.

Action	Points
Best knowledge transfer of the year	40
Knowledge transferred during web meeting	30
Presentation during a web meeting	20
Answer on the community website	15
Knowledge transferred on website	15
Participation to a web meeting	10
Document posted on the community website	5
Request for help on the community website	5

Table 2 Number of points awarded by type of activity

In 2010, the HMI CoP had more than 400 members in more than 60 countries. The members mostly come from Europe (51%, Russia included) and North America (23%) with Asia and Oceania accounting for only 16%. The membership is mainly product engineers, design engineers, marketing and sales executives; although a number of technical support staff are also members. Product engineers and marketing managers represent 48% of member's positions but account for about 62% of total community activity.

4.2. The IT Tools Used by the Community

Currently the community uses two main tools: a community web site and monthly 'web meetings', although there are plans to introduce Web 2.0 tools such as wikis and blogs in the future.

The Website

The community's website is a shared web space; it is divided into rooms and sub rooms and contains a link to a similar HMI community in a daughter company in China. There is a section on community life, general information, marketing and sales, and a discussion corner, where any topic, related to the product or application can be discussed. Members make use of the website as a meeting place and as a point of reference. Any member can add new content to the site or comment on an already existing item.

The Web Meetings

The technology used for the meetings is a basic web-based platform with an audio link and a shared desktop. In addition, there is also an asynchronous chat window, which is used for private conversations. The meetings are based on time zones: one for America and Europe, the other for Asia and Oceania. Each meeting consists of presentations by members on subjects such as technical best practices, applications / solutions, market conditions and 'tricks of the trade'. There are also occasional presentations on new products or features. The meetings usually end with information about community life. In 2010, each meeting had an average of 70 participants although only a small proportion of these participants actually made presentations.

4.3. Methodology

Our approach was broadly inductive and could be characterized as an exploratory case study (Eisenhardt, 1989; Yin, 2003). Our main data collection instrument was semi-structured interviews by telephone augmented with additional data from documentation supplied by the company and observation of community meetings. The Table 3 below shows the characteristics of those we interviewed.

Country	Status	New core member?	Title	Position
Australia	Core	Yes	Senior marketing engineer	Marketing
Switzerland	Core	Yes	Product marketing manager	Marketing
Switzerland	Core	Yes	Manager application centre	Product Application
Canada	Core	No	Senior applications specialist	Product Application
Denmark	Core	No	Product application engineer	Product Application
Hungary	Core	No	Technical support (methods)	Support
Indonesia	Non-core	-	Technical support (sales)	Support
Indonesia	Ex-core	-	Product marketing manager	Marketing
France	Animator	-		

Table 3 The Interviewees

The data produced was transcribed, processed and analyzed in order to identify any significant results. For our data analysis and interpretation, we chose the thematic content analysis method (Berelson, 1952) which is based on a system of themes and sub-themes. We made a two-step qualitative analysis of what had been said: (1) content

analysis of the transcribed interviews involved analysing them one by one, then (2) analysing them all together by themes. The sequential analyses of each interview helped to identify the range of themes discussed by the interviewees and the thematic analysis helped us to define the classification outlined below.

5. The Results of the Case Study

The case study provided a number of interesting results, some of which have been commented on elsewhere (Bourdon, Tessier, & Kimble, 2011; Kimble, Tessier, & Bourdon, 2009). In this paper, we will focus specifically on the structural characteristics of the community in order to highlight issues related to human relationships and the problems of sharing knowledge remotely within a corporate setting.

5.1. Motivations

In our study, we found a number of different reasons for participating in the community, which we aggregated in three generic profiles:

The Sharers

This profile is of somebody who not only thinks that knowledge sharing is a necessity but has integrated the culture of sharing into their everyday life. They have very positive attitudes towards the community and their source of satisfaction is to learn from others. For example,

> *"When I have to solve a problem, I like to be able to pass on that knowledge because I am sure other people will have the same problem and it will save them time. I don't expect a pat on the back for doing it; it is something I like doing" (Applications specialist, Americas)*

The Searchers

These are people who look for information that could be used in their job or to serve the wider business. Their objectives are more focused than the 'sharer'. While they believe

in the principle of sharing, they are principally concerned with meeting specific functional goals. For example,

> *"I only engage with the site if there is a topic of interest in the newsletter" (Technical support, Europe)*

The Networkers

These are simply individuals who want to get to know other people, not only to develop professional networks and share knowledge but also to share and develop personal interests. Their objective is often simply to develop a relationship with the experts on a particular topic.

> *"... it's a place where you can get to know experts in different areas in different countries - get to know other people and their expertise" (Marketing, Asia)*

5.2. Relationships within the Community

The study revealed a number of different relationships within the community. Some draw a distinction between active and inactive members while others highlighted the different ways in which the technical and the sales teams used the community. For example, one respondent underlines the differences between technical support and marketing noting that,

> *"Problems of misunderstandings between technical and marketing are a frequent theme" (Marketing, Europe)*

This observation is particularly surprising as this was the very gap that the community was supposed to close.

Another source of division was the perception that much of what happens in the community is driven from France,

"People from France decide how we should develop the community and a couple of countries disagree with that and request different things" (Marketing, Asia)

When we asked respondents to tell us about the conflicts in the community, we were told,

"No conflict but debate ... we can only say our opinion, but in the end the decision comes from the top management ... so sometimes it doesn't always end up happy" (Sales, Asia)

The European viewpoint is expressed in the following quote.

"... other countries do have others expectations of what they get out of the community - some participate to share and others participate to complain" (Engineering, Europe)

5.3. Relationships between the Community and the Company

The last set of observations from our case study concerns the relationships between the community and the rest of the organization. The community has a degree of official recognition within Schneider Electric although it was made clear that participation in the community was voluntary and did not form part of any formal assessment regarding promotions etc.

Some people saw membership of the community as offering (indirect) rewards through giving them greater influence in Schneider Electric. Some saw it as putting them in communication with people in France who were perceived to be influential. For others it was seen as a route to personal recognition from local peers or as a way to influence members in other countries.

"No influence from membership [in my own unit] but I may have more influence with others outside my own country" (Marketing, Europe)

For another set of respondents however, the connection with the company was almost incidental. For example, a core member of the community commented,

> *"My manager knows that I am in the core team, the only thing he said is "good job" but that's it" (Marketing, Europe)*

While others told us that they participated in the community during their own free time,

> *"Managers don't care if you participate, you do in your own time ... I spend my spare time in the community and my working hours working" (Engineering, Europe)*

6. Key Issues for Researchers

We saw in the introduction that a company's efforts to share and manage knowledge were driven by the belief that knowledge was a resource that needed to be managed like any other resource but, unlike many other resources, was difficult for competitors to copy and appropriate. We also saw that although early attempts to manage knowledge were based on trying to codify knowledge and store it in a KMS, this approach presents certain problems.

It has been argued elsewhere (Hildreth & Kimble, 2002; Pan et al., 2003) that community-based approaches to KM creates groups within which there is a 'semantic consensus' that can help to overcome the problems of changing or incomplete descriptions. However, as we have seen in our case study, in addition to the inevitable communication problems associated with on-line working (Kimble, 2011) the members of such groups are motivated by a variety of different factors and they also contain a wide range of differing opinions. This presents a particular problem for knowledge sharing: if one group does not share the other's worldview, how can the communication between the two ever, in Clark and Brennan's (1991) terms, be grounded?

Several other studies show that there can be a wide range of opinions and modes of operation within such groups (Cummings, 2004; Ribeiro, Kimble, & Cairns, 2010) and the implications of this diversity for knowledge sharing is profound. The majority of the literature that deals with this issue tend towards what Tsoukas (1996) describes as a taxonomic approach: seeking to discover global, or at least generic, solutions. However quoting Boden (1994) he claims that the structures that shape how knowledge is shared are always and inevitably influenced by "*immediate circumstances and local agendas*" (Boden, 1994, p. 18) arguing that where categories and taxonomies exist, "*The stability of their meanings is precariously maintained*" (Tsoukas & Chia, 2002, p. 573).

Brokers (Wenger, 1998) and boundary objects (Star & Griesemer, 1989) are widely cited as providing two possible channels through which epistemically and politically distinct groups can communicate however even these have been shown to subject to 'political' interplay (Kimble, Grenier, & Goglio-Primard, 2010). Similarly, Galison's (1997) notion of "*trading zones*" has also been applied to the problem of creating stable representations suitable for knowledge sharing, notably by Harvey and Chrisman (1998). However, whatever approach is chosen, we believe that research into knowledge sharing in on-line communities must recognize the plurality and diversity that exists in such groups and should take account of the effect that these 'local' agendas might have on their work.

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